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⑤④ **Roller card, particularly for preparing non-woven textile webs and slivers for semi-worsted yarns.**

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## Description

The present invention relates generally to cards with multiple carding units, particularly for preparing non-woven textile webs and slivers for semi-worsted yarns.

In particular, the invention concerns a roller card of the type including at least one first stage, at least one second stage, and a third stage, in which:

- the or each first stage includes a licker-in unit for the supply of staple fibres to a first carding unit formed by a cylinder and intermediate roll combing means cooperating with the cylinder,
- the or each second stage includes roller conveyor means supplied by the intermediate combing means, and
- the third stage includes a second carding unit formed by a cylinder supplied by the roller conveyor means and at least two output combing rolls cooperating with the cylinder, and doffer means fed by the output combing rolls.

Roller cards of this type are generally provided with a single first stage and a single second stage which form, with the third stage, a card with two carding units of which the first serves to supply and rough the material, and the second to improve the opening, distribute the fibre, and to form and discharge the web.

The presence of two output combing rolls instead of a single output combing roll allows the production to be improved from both the quantitative and qualitative aspects, since the web or sliver leaving the machine is composed of two layers with greater homogeneity and strength for the same weight as a web composed of a single layer. Furthermore, the possibility of superposing two layers allows a web or sliver of greater unit weight to be obtained.

The object of the present invention is to provide a card of the type specified above, which is able further to improve the productivity of the machine and the quality of the web or sliver produced by the machine.

According to the invention, this object is achieved by virtue of the fact that the intermediate combing means include at least two intermediate combing rolls for forming respective webs, and the conveyor means include at least two conveyor rollers each cooperating with a respective intermediate combing roll.

This characteristic considerably increases the advantages due to the presence of two output combing rolls in that the presence of two or more intermediate combing rolls, with their respective conveyor rollers, allows the cylinder of the third stage to be supplied with a greater quantity of fibre, thus achieving greater production and improved quality in terms of homogeneity and strength of the final web or sliver.

Preferably, the cylinder of the or each first stage is covered by a cloth with a low angular value and with pointed ends facing in the direction of rotation, which corresponds to that of the advance of the material.

Conveniently, however, the intermediate combers are covered by cloths with a high angular value and

with pointed ends facing in the opposite direction from that of rotation.

The intermediate combers may be covered by cloths with different angles and densities, and may have different peripheral velocities.

The conveyor rollers have cloths with pointed ends facing in the opposite direction from that of the advance of the material and strip the two combers by drawing (peripheral velocity greater than that of the combers) or by «condensation» (peripheral velocity lower than that of the combers), transferring the web just formed to the cylinder of the final stage without altering its characteristics.

The invention will now be described in detail with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a schematic illustration of a roller card according to the invention, and

Figure 2 illustrates part of Figure 1 on an enlarged scale.

The embodiment illustrated in the drawings relates to a roller card with two carding units, particularly for producing non-woven textile webs and slivers for semi-worsted yarns. It should be noted, however, that what is described below can also be applied to cards having a greater number of carding units.

The card illustrated is composed of a first stage generally indicated I, a second stage generally indicated II, and a third section generally indicated III.

Stage I includes an endless-belt feed conveyor A for supplying staple fibres to opening members with rolls B, C, and a first carding unit consisting of a cylinder D and two intermediate combing rolls E<sub>1</sub>, E<sub>2</sub>. The senses of rotation of the rollers B, C, D, E<sub>1</sub> and E<sub>2</sub> are those indicated by arrows in the drawings.

Preferably, the cylinder D is covered by a cloth with a low angular value and pointed ends facing in the direction of rotation, that is, in the direction of advance of the material.

The two intermediate combers E<sub>1</sub>, E<sub>2</sub>, which replace the single intermediate combing member present in conventional cards, are covered, however, by cloths with a high angular value and with pointed ends facing in the opposite direction from that of the rotation.

It should be noted that the two intermediate combers E<sub>1</sub>, E<sub>2</sub> may be covered by cloths with angles and densities that are the same or different, and may have the same or different peripheral velocities.

Stage II is constituted by two conveyor or doffer rollers F<sub>1</sub>, F<sub>2</sub> each of which cooperates with a respective intermediate combing member E<sub>1</sub>, E<sub>2</sub>. The two conveyor rollers F<sub>1</sub>, F<sub>2</sub>, which in practice act as transfer members between stage I and stage III, are covered by cloths with pointed ends facing in the direction of rotation indicated by the arrows, and may have a peripheral velocity greater than or less than that of the respective intermediate combers E<sub>1</sub>, E<sub>2</sub>. In the first case, the stripping action exerted by the conveyor rollers, F<sub>1</sub>, F<sub>2</sub> on the respective intermediate combers E<sub>1</sub>, E<sub>2</sub> occurs by a drawing action, while in the second case it is achieved by «condensation».

Stage III includes a second carding unit formed by a cylinder G and by two output combers H<sub>1</sub>, H<sub>2</sub> rotatable in the senses indicated by the respective

arrows. The two combers  $H_1$ ,  $H_2$  supply respective doffer members  $P_1$ ,  $P_2$ .

As stated above, stages I, II and III form a card with two carding units, in which stage I serves to supply and rough the material and stage III serves to improve the opening, distribute the fibre, and to form and discharge the web or sliver.

The function of the two intermediate combers  $E_1$ ,  $E_2$  is that of collecting the fibres from the cylinder D on their surfaces to form two webs. The two webs formed in the first stage are conveyed by means of the two conveyor rollers  $F_1$ ,  $F_2$  to stage III. The latter is thus supplied with a greater quantity of fibres, achieving greater production and better quality of the web or sliver. In fact, the clearing of the cylinder D by the two intermediate combers  $E_1$ ,  $E_2$  halves the faults in the feed onto the cylinder G, in that the supplied collections of fibres are separated into two different paths. Thus, in practice, it is possible to obtain a web with considerable homogeneity and uniformity even from the first stage of the card and even when starting with staple fibres of very different densities (different fibre qualities, deniers and lengths).

On the other hand, the greater production obtainable with two (or more) intermediate combing rolls, permits the use of finer cloths of greater carding power from stage I, thus allowing a further improvement in the quality of the final product.

Furthermore, the presence of two (or more) intermediate combers allows them to have different peripheral velocities and hence different dispositions of the fibres on their surfaces, thereby increasing the uniformity of the webs.

These advantages are added to those achieved by the presence of two (or more) output combers whereby, in conclusion, the card according to the invention allows substantial improvements to be obtained in the final product from both the quantitative and qualitative aspects, in terms of greater homogeneity and strength as well as greater unit weights of the webs.

Naturally, the constructional details and forms of embodiment may be varied widely with respect to that described and illustrated, without thereby departing from the scope of the present invention.

#### Claims

1. Roller card, particularly for preparing non-woven textile webs and slivers for semi-worsted yarns, including at least one first stage, at least one second stage, and a third stage, in which:

- the or each first stage includes a lick-in unit for the supply of staple fibres to a first carding unit formed by a cylinder and intermediate roll combing means cooperating with the cylinder,

- the or each second stage includes roller conveyor means supplied by the intermediate roll combing means, and

- the third stage includes a second carding unit formed by a cylinder supplied by the roller conveyor means and at least two output combing rolls cooper-

ating with the cylinder, and doffer means fed by the output combing rolls,

characterised in that the intermediate roll combing means include at least two intermediate combing rolls ( $E_1$ ,  $E_2$ ) for formings respective webs, and the conveyor means include at least two conveyor rollers ( $F_1$ ,  $F_2$ ) each cooperating with a respective intermediate combing roll ( $E_1$ ,  $E_2$ ).

2. Card according to claim 1, characterised in that the two intermediate combers ( $E_1$ ,  $E_2$ ) are covered by cloths with a high angular value and with pointed ends facing in the opposite direction from that of rotation.

3. Card according to claim 2, characterised in that the two intermediate combers ( $E_1$ ,  $E_2$ ) are covered by cloths with different angles and densities.

4. Card according to claim 2, characterised in that the two intermediate combers ( $E_1$ ,  $E_2$ ) are covered by cloths with the same angle and density.

5. Card according to claim 2, characterised in that the two intermediate combers ( $E_1$ ,  $E_2$ ) are driven at different peripheral velocities.

6. Card according to claim 2, characterised in that the two intermediate combers ( $E_1$ ,  $E_2$ ) are driven at the same peripheral velocity.

7. Card according to any one of the preceding claims, characterised in that the conveyor rollers ( $F_1$ ,  $F_2$ ) are driven at greater peripheral velocities than the respective intermediate combers ( $E_1$ ,  $E_2$ ).

8. Card according to any one of claims 1 to 6, characterised in that the conveyor rollers ( $F_1$ ,  $F_2$ ) are driven at lower peripheral velocities than the respective intermediate combers ( $E_1$ ,  $E_2$ ).

9. Card according to any one of claims 1 to 6, characterised in that the conveyor rollers ( $F_1$ ,  $F_2$ ) are driven one at a greater peripheral velocity and the other at a lower peripheral velocity than the respective intermediate combers ( $E_1$ ,  $E_2$ ).

#### Patentansprüche

1. Walzenkarde, die besonders zur Vorbereitung von nichtgewebten textilen Vliesen und Luntten für Halbkammgarne geeignet ist, wobei sie zumindest eine erste Stufe, zumindest eine zweite Stufe sowie eine dritte Stufe aufweist, wobei:

- die erste oder jede erste Stufe eine Beschickungseinheit für die Zufuhr von Stapelfasern zu einer ersten Kardeneinheit aufweist, die von einem Zylinder und einer Zwischenwalzenkämmeinrichtung gebildet wird, die mit dem Zylinder zusammenwirkt,

- die zweite oder jede zweite Stufe eine Walzenfördereinrichtung aufweist, die von der Zwischenwalzenkämmeinrichtung beschickt wird, und

- die dritte Stufe eine zweite Kardeneinheit, die von einem Zylinder gebildet wird, der von der Walzenfördereinrichtung beschickt wird, wobei zumindest zwei Ausgangskämmwalzen mit dem Zylinder zusammenwirken, sowie eine Abzieheinrichtung aufweist, die von den Ausgangskämmwalzen beschickt wird,

dadurch gekennzeichnet, dass die Zwischenwalzenkämmeinrichtung zumindest zwei Zwischenkämm-

walzen ( $E_1$ ,  $E_3$ ) aufweist, um entsprechende Vliese auszubilden, und die Fördereinrichtung zumindest zwei Förderwalzen ( $F_1$ ,  $F_2$ ) aufweist, von denen jede mit einer entsprechenden Zwischenkämmlwalze ( $E_1$ ,  $E_2$ ) zusammenwirkt.

2. Karde gemäss Anspruch 1, dadurch gekennzeichnet, dass die beiden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) mit Tüchern mit einem grossen Winkel überzogen sind, wobei die spitzen Enden entgegengesetzt zur Drehrichtung liegen.

3. Karde gemäss Anspruch 2, dadurch gekennzeichnet, dass die beiden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) mit Tüchern mit unterschiedlichen Winkeln und Dichten überzogen sind.

4. Karde gemäss Anspruch 2, dadurch gekennzeichnet, dass die beiden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) mit Tüchern mit gleichem Winkel und Dichte überzogen sind.

5. Karde gemäss Anspruch 2, dadurch gekennzeichnet, dass die beiden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) mit unterschiedlichen Umfangsgeschwindigkeiten angetrieben werden.

6. Karde gemäss Anspruch 2, dadurch gekennzeichnet, dass die beiden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) mit der gleichen Umfangsgeschwindigkeit angetrieben werden.

7. Karde gemäss jedem der bisherigen Ansprüche, dadurch gekennzeichnet, dass die Förderwalzen ( $F_1$ ,  $F_2$ ) mit einer grösseren Umfangsgeschwindigkeit angetrieben werden als die entsprechenden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ).

8. Karde gemäss jedem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass die Förderwalzen ( $F_1$ ,  $F_2$ ) mit einer niedrigeren Umfangsgeschwindigkeit als die entsprechenden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) angetrieben werden.

9. Karde gemäss jedem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass eine der Förderwalzen ( $F_1$ ,  $F_2$ ) mit einer grösseren Umfangsgeschwindigkeit und die andere mit einer kleineren Umfangsgeschwindigkeit als die entsprechenden Zwischenkämmlrichtungen ( $E_1$ ,  $E_2$ ) angetrieben wird.

#### Revendications

1. Carde à cylindres destinée spécialement à la préparation des voiles textiles non-tissés et des rubans de cardage pour fils semi-peignés, comprenant au moins un premier étage, au moins un deuxième étage et un troisième étage, dans laquelle:

— le — ou chaque — premier étage comporte un briseur destiné à l'alimentation des fibres à une première unité de cardage formée par un cylindre, des

moyens intermédiaires de peignage à rouleaux coopérant avec le cylindre,

— le — ou chaque — deuxième étage comporte un transporteur à rouleaux alimenté par le moyen intermédiaire de peignage à rouleau, et

— le troisième étage comporte une seconde unité de cardage formée par un cylindre alimenté par le transporteur à rouleaux, et au moins deux rouleaux de peignage de sortie coopérant avec le cylindre et des organes peigneurs alimentés par les rouleaux de peignage de sortie,

caractérisée en ce que le moyen intermédiaire de peignage à rouleau comporte au moins deux rouleaux intermédiaires de peignage ( $E_1$ ,  $E_2$ ) pour la formation des voiles respectifs, et le moyen transporteur comporte au moins deux rouleaux transporteurs ( $F_1$ ,  $F_2$ ) chacun coopérant avec un rouleau respectif de peignage intermédiaire ( $E_1$ ,  $E_2$ ).

2. Carde selon la revendication 2, caractérisée en ce que les deux peigneurs intermédiaires ( $E_1$ ,  $E_2$ ) sont recouverts d'une garniture d'une valeur angulaire élevée et présentant des extrémités pointues se dressant dans le sens opposé au sens de rotation.

3. Carde selon la revendication 2, caractérisée en ce que les deux peigneurs intermédiaires ( $E_1$ ,  $E_2$ ) sont recouverts d'une garniture présentant des densités et angles différents.

4. Carde selon la revendication 2, caractérisée en ce que les deux peigneurs intermédiaires ( $E_1$ ,  $E_2$ ) sont chacun recouverts d'une garniture présentant le même angle et la même densité.

5. Carde selon la revendication 2, caractérisée en ce que les deux peigneurs intermédiaires ( $E_1$ ,  $E_2$ ) sont entraînés à des vitesses circonférentielles différentes.

6. Carde selon la revendication 2, caractérisée en ce que les deux peigneurs intermédiaires ( $E_1$ ,  $E_2$ ) sont entraînés à la même vitesse circonférentielle.

7. Carde selon l'une quelconque des revendications précédentes, caractérisée en ce que les transporteurs à rouleaux ( $F_1$ ,  $F_2$ ) sont entraînés à des vitesses circonférentielles supérieures à celles de leur peigneur intermédiaire respectif ( $E_1$ ,  $E_2$ ).

8. Carde selon l'une quelconque des revendications 1 à 6, caractérisée en ce que les transporteurs à rouleaux ( $F_1$ ,  $F_2$ ) sont entraînés à des vitesses circonférentielles inférieures à celles de leur peigneur intermédiaire respectif ( $E_1$ ,  $E_2$ ).

9. Carde selon l'une quelconque des revendications 1 à 6, caractérisée en ce que les transporteurs à rouleaux ( $F_1$ ,  $F_2$ ) sont entraînés l'un à une vitesse circonférentielle supérieure et l'autre à une vitesse circonférentielle inférieure à celle de leur peigneur intermédiaire respectif ( $E_1$ ,  $E_2$ ).

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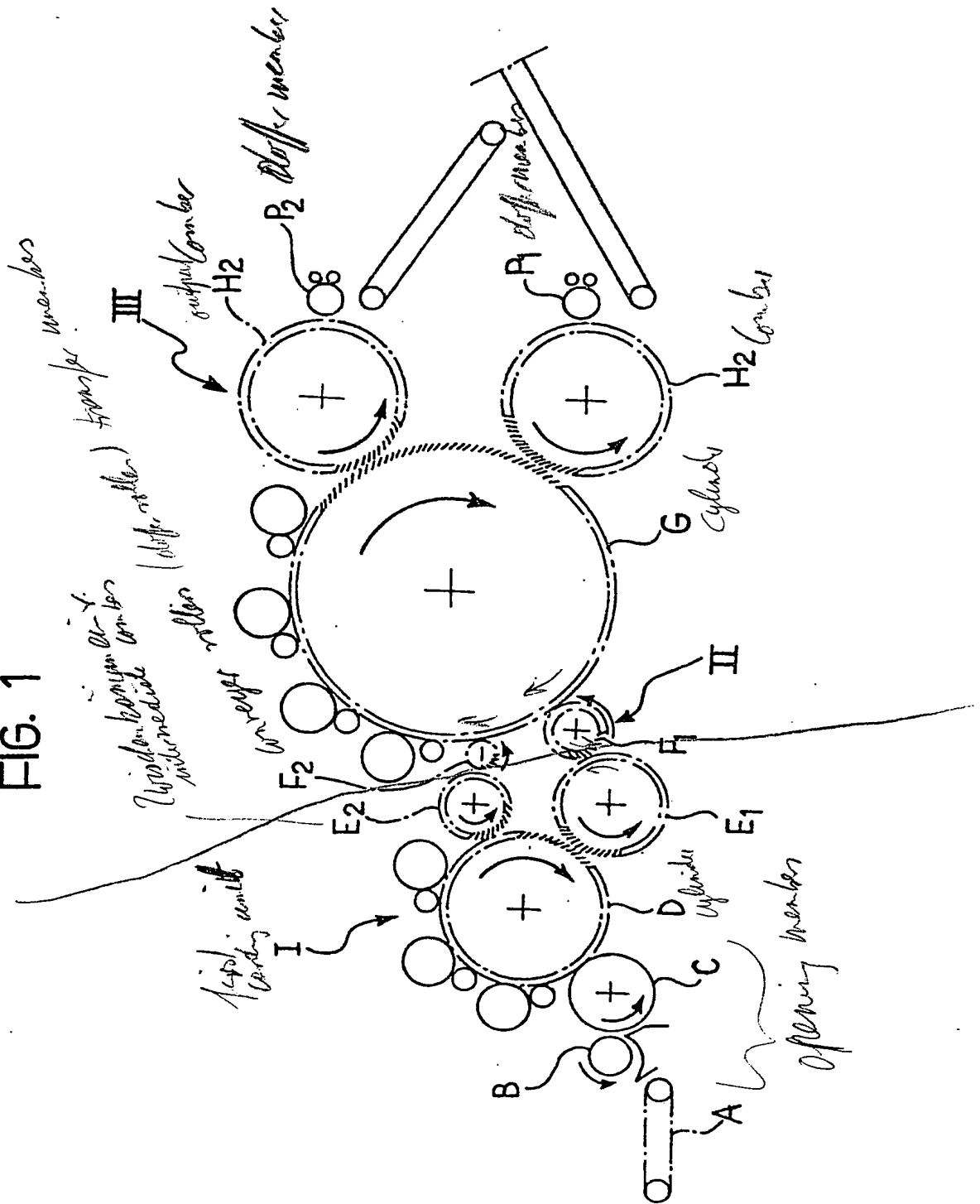


FIG. 2

